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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service

August 1958
ARS 42-22

BIBLIOGRAPHY ON ELECTRIC AND RELATED EQUIPMENT
FOR LIVESTOCK PRODUCTION AND FEEDING

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INTRODUCTION

This bibliography was prepared in the Farm Electrification Research Laboratory, Agricultural Engineering Research Division, as a part of a project involving electrical equipment for the reduction of labor in dairy production operations. The bibliography is limited to equipment used in livestock production facilities and excludes the following specific subjects: environmental control equipment, structures, bulk-milk-cooling and processing equipment, milking parlors, and field harvesting equipment.

This bibliography contains material available in the United States and Canada between 1948 and 1958. In addition, a few references of earlier origin have been included because of their appropriateness. The references are primarily research results or technical reports. This information has been collected from the Bibliography of Agriculture, state publication lists, and subject matter files of the U.S.D.A. It would be appreciated if readers would inform the compiler of any omissions or errors.

This bibliography was compiled with the helpful assistance of Barton C. Reynolds, State Experiment Stations Division, A.R.S., and other personnel of the Farm Electrification Research Laboratory.

Agriculture - Washington

AUTHOR INDEX

1. ALBAUGH, Reuben, KELLY, C. F., and BELTON, H. L. "Beef Handling and Feeding Equipment". Calif. Agr. Expt. Sta. Cir. 414. May 1952.
2. ALGEO, J. W. "Mechanizing Cattle Feeding and Lessening Hand Labor". Wash. State Col. Dept. Animal Husbandry Stockman's Handbook. p. 196-197. December 1955.
3. ALTMAN, Landy B. "Automatic Livestock Waterers". USDA Leaf. 395. November 1955.
4. ARNOLD, H. A. "Automatic Silage Feeder". Farm and Home Science. Tenn. Agr. Expt. Sta. Prog. Rep. 6. April 1953.
5. BARGER, E. L. "Grass Silage Mechanized". Iowa Farm Science 3:11. Iowa Agr. Expt. Sta. May 1949.
6. BARGER, E. L. "Results of Tests on Mechanical Unloading Devices for Chopped Forages". Agr. Engr. 30:5. p. 223. May 1949.
7. BARNES, Kenneth K., and BERESFORD, Hobart. "Self-Feeding of Chopped Hay". Agr. Engr. 35:8. p. 551. August 1954.
8. BEHM, H. J., and FULLER, R. G. "Electricity and Agriculture". Battelle Tech. Rev. 10:6. p. 3-8. October 1957.
9. BERESFORD, H. "Idaho Labor-Saving Ideas". Univ. of Idaho Ext. Bul. 158. 1946.
10. BERGE, O. I. "Emergency Operation of Milking Machines". Wis. Ext. Ser. Cir. 542. March 1957.
11. BOOK, J. H., et al. "Report on a Milk-Flow Meter for Pipeline Systems". U.S. Agr. Res. Serv. ARS 44-20. June 1958.
12. BOWEN, R. "How to Mechanize Haymaking". Hoard's Dairyman. p. 294. March 25, 1956.
13. BOWEN, R. "Automatic Handling of Feeds and Forage". Paper. AIEE Farm Elect. Conf. CP 57-1172. October 1957.
14. BOYD, L. L. "Mechanical Silage and Grain Feeder". N. Y. Farm Elect. Council Prog. Rep. Sec. IV. 1953.
15. BRODELL, Albert P., and COOPER, M. R. "Power and Machinery on Farms and Related Data". U.S. Agr. Res. Serv. ARS 43-26. April 1956.
16. BROOKFIELD, M. B. "Forage Elevator". 1950 Prog. Rep. to N. Y. Farm Elect. Council. N. Y. State Col. of Agr. March 1951.
17. BROOKS, L. A. "Characteristics of Electrified Experimental Farm". Paper. AIEE Farm Elect. Conf. CP 57-1160. October 1957.
18. BROOKS, L. A. "Handling and Processing Grain Feeds". Paper. ASAE. Chicago, Ill. December 1951.
19. BROWN, D. P., et al. "Recent Designs in Dairy Stalls". W. Va. Agr. Expt. Sta. Tech. Paper 428. August 1950.
20. BROWNSON, L. "Field Report on Automatic Feeding". Nat'l Assoc. Silo Mfrs. Proc. 43. p. 22-39. 1955.
21. BRUHN, H. D. "Engineering Problems in Pelletized Feeds". Agr. Engr. 38:7. p. 522. July 1957.
22. BRUHN, H. D. "Pelletizing Grain and Hay Mixtures". Agr. Engr. 36:5. p. 330-331. May 1955.
23. BUTLIEN, Sheldon, and McGURK, J. L. "A Study of the Cost and Operation of Mechanical Barn Cleaners". Cornell Univ. Ag. Eco. 826. Mimeo. July 1952.
24. BUTT, J. L. "Harvesting and Storing Silage". Ala. Agr. Expt. Sta. Cir. 117. 1956.
25. BUTT, J. L. "Results of Performance Tests of a Small Farm Mixer-Grinder". Ala. Agr. Expt. Sta. Prog. Rep. 57. August 1955.
26. BUZZELL, J. R. "Belt Type Forage Impeller". Univ. of Maine. Unpub. Spec. Prob. Rep. 1957.
27. BYERS, George B. "Effect of Work Methods and Building Designs on Building Costs and Labor Efficiency for Dairy Chores". Ky. Agr. Expt. Sta. Bul. 589. June 1952.

28. CARGILL, B. F., and RALSTON, N. P.
"Progress Report of Loose Housing for Dairy Cattle in Steel Building". Mich. Agr. Expt. Sta. Quarterly Bul. 38:1. August 1955.
29. CARTER, Deane G., and VAN ARSDALL, R. N.
"Economical Analysis of Farm Dairy Buildings". Agr. Engr. 35:1. p. 19-21, 27. January 1954.
30. CHAMBERS, C. R. "Mechanical Livestock Feeding". Wash. State Col. Dept. Animal Husbandry Stockman's Handbook. p. 17-18. December 1955.
31. CRANE, J. W., and CARLETON, W. M.
"Predicting Pressure Drop in Pneumatic Conveying of Grains". Agr. Engr. 38:3. p. 168-171, 180. March 1957.
32. DAVIS, Joe F., and STANIFORTH, Sydney D.
"Electricity on Farms in the Eastern Dairy Area of Wisconsin". Info. Bul. 143. October 1955.
33. DeFOREST, S. S. "Development of a High Speed Drag-Type Elevator for Chopped Forages". MS Thesis. Iowa State College. 1947.
34. DeFOREST, S. S. "Grain Handling - Engineer it for Efficiency". Successful Farming - Materials Handling - Newest Farm Science. Part I. 1955.
35. DeFOREST, S. S. "Grain Handling - Make it Continuous all the Way". Successful Farming - Materials Handling - Newest Farm Science. Part 2. 1955.
36. DEXTER, S. T. "A Self-Loading and Self-Unloading Wagon for Long Hay". Mich. Agr. Expt. Sta. Quarterly Bul. 31. p. 313-320. February 1949.
37. DOBIE, John B. "Mechanical Feeding of Livestock". Agr. Engr. 36:7. p. 458. July 1955.
38. DOBIE, John B. "The Electric Hay Hoist". Calif. Agr. Ext. Ser. Cir. 139. September 1947.
39. DONOGHUE, Lawrence. "Development and Investigation of a Power-Operated Silage Cart". Ontario Agr. Col. Guelph. Thesis in Agr. Engr. May 1954.
40. DUDLEY, A. "Mobile Pelletting - New Concept in Feed Production?". Farm Mangt. 6:8. p. 26-28. August 1957.
41. DUFFEE, F. W. "Efficient Forage Handling". Guernsey Breeders' Jour. (Peterborough) 100:1. p. 21-23, 30. July 1, 1957.
42. DUFFEE, F. W., and BROOKS, L. A. "Feed Carts Make Light Work of Heavy Chores". Univ. of Wis. Agr. Expt. Sta. Spec. Bul. 2. June 1952.
43. EPP, A. W. "Cost of Operating Machinery on Nebraska Farms". Nebr. Agr. Expt. Sta. Bul. 413. September 1952.
44. FELLOWS, I. F. "Bibliography of Forage Harvesting Research in the Northeast". Storrs Agr. Expt. Sta. Univ. of Conn. November 1952.
45. FELLOWS, I. F. "Comparison of Hay Harvesting Methods". Conn. Agr. Ext. Ser. Mimeo. December 1948.
46. FENTON, F. C., and FAIRBANKS, G. E. "The Cost of Using Farm Machinery". Kans. Eng'g. Exp. Sta. Bul. 74. September 1954.
47. FORTH, M. W. "Hammer Mill Design for Automatic Ear Corn Grinding with Electric Power". Univ. of Ill. Thesis (Unpub.) 1953.
48. FORTH, M. W., FOOTE, L. S., and MOWERY, R. W. "Automatic Feed Grinding and Handling". Agr. Engr. 32:11. p. 601-605. November 1951.
49. FORTH, M. W., and LEHMANN, E. W. "Feed Grinding with Electric Motors". Agr. Engr. 35:9. p. 648. September 1954.
50. FORTH, M. W., and LEHMANN, E. W. "Performance and Electrical Load Characteristics of Automatic 5-HP Grinders and Motors". Ill. Agr. Expt. Sta. Bul. 581. September 1954.
51. GARNSEY, E. E. "Automation in the Feed Lot". Cattleman 44:5. p. 32-33, 52, 54-56, 58. October 1957.
52. GEISER, Stan. "Handling Water". Successful Farming - Materials Handling - Newest Farm Science. Part 5. 1955.
53. GOWDER, M. T. "Farm Machinery vs. Hand Labor". Mimeo. Univ. of Tenn. December 1950.
54. GRANT, Fred M. "Farm Methods of Cooling Milk". USDA Farmers Bul. 2079. March 1955.

55. GREIG, Eugene S. "Some Mechanical Devices for Handling Livestock Feeds". Thesis in Agr. Engr. Univ. of Idaho. May 1954.
56. GUFFEY, J. E. "Bedding Requirements for Dairy Cows in Loose and Conventional Housing". MS Thesis. Penn State Univ. 1957.
57. GUMMERSHEIMER, M. A. "A Time-Travel and Construction Cost Study of Dairy Cattle Housing at the Penn State University Dairy Production Center". MS Thesis. Penn State Univ. 1957.
58. GUTSCH, N. V. "Automation, Air-Conditioning, Drying Equipment, and More Uses of Power Will Grow in the Farm's Electric Future". Chemurgic Digest 15:8. p. 8-11. September 1956.
59. HALL, Carl W. "Agricultural Processing, Past, Present, and Future". Agr. Engr. 38:6. p. 436. June 1957.
60. HANSEN, Hugh J. "Chopped Hay Conveyor and Distributor". N. Y. Farm Elect. Council Prog. Rep. Sec. 3. 1952.
61. HANSON, Dick. "Materials You Buy". Successful Farming - Materials Handling - Newest Farm Science. Part 6. 1955.
62. HAWTHORN, Fred. "Handling Chopped Forages on the Farm". Agr. Engr. 30:3. p. 127. March 1949.
63. HECHT, Reuben W. "Labor Used for Livestock". ARS Statistical Bul. 161. May 1955.
64. HECHT, Reuben W., and BARTON, Glenn T. "Gains in Productivity of Farm Labor". USDA Tech. Bul. 1020. December 1950.
65. HIENTON, T. E. "Trends in Rural Electrification". Agr. Engr. 38:6. p. 453. June 1957.
66. HODGES, L. H. "The Design of a General-Purpose Farm Wagon Rack for Mechanical Unloading". Agr. Engr. 30:3. p. 124. March 1949.
67. HODGSON, R. E. "What Engineers Should Know about Feeds for Dairy Cattle". Paper. ASAE Chicago, Ill. December 1953.
68. HOGLUND, C. R. "Economics in Producing and Feeding Roughage and Grain to Dairy Cows". Mich. State Col. Ag. Econ. 620. Mimeo. June 22, 1955.
69. HUDSON, W. G. "Bucket Elevators". Modern Materials Handling 6:8. p. 36-50. August 1951.
70. HUDSON, W. G. "Evaluating materials Handling Layouts". Chem. Eng. 54:8. p. 110-112. August 1947.
71. HUNTINGTON, D. H., and RICH, N. H. "Mechanical Silage Unloading Saves Labor". Maine Farm Research. p. 10-13. January 1956.
72. HUPP, E. W., et al. "Problems Involved in Using a Milk Metering Device". (Abs.) Jour. Animal Science 16:4. p. 1050. November 1957.
73. HUPP, E. W., et al. "The Accuracy of a Milk Metering Device". Mich. Agr. Expt. Sta. Quarterly Bul. 40:2. p. 365-374. November 1957.
74. JOHNSON, Paul C. "What Farmers Want and Need in Tractors and Implements". Agr. Engr. 35:4. p. 230-232. April 1954.
75. JONES, T. N. "Self-Feeding Rack for Trailer". Miss. Agr. Expt. Sta. Cir. 208. April 1957.
76. JUTRAS, P. J. "An Analysis of the Methods and Equipment Used in Handling Baled Hay in the Northeast". Unpub. MS Thesis. Univ. of Maine. 1957.
77. JUTRAS, P. J. "Handling Baled Hay Need Not be a Backbreaking Job". Maine Farm Research. Vol. 5. April 1957.
78. KALBFLEISCH, W. "Livestock Equipment". Agric. Institute Review. p. 59-61. March-April 1956.
79. KEEPERS, W. F. "Farm Materials Handling: Special Applications: Mechanical Feeding". Impl. & Tractor 71:18. p. 30-31. September 7, 1957.
80. KEEPERS, W. F. "Replace Baskets and Shovels with Mechanical Feeders". Hoard's Dairyman 102:2. p. 68. January 25, 1957.
81. KEEPERS, W. F. "The Practicability of the Electric-Powered Barn Cleaners". Paper. North Atlantic Section ASAE. August 1951.
82. KEEPERS, W. F. "The Silo Unloader Industry". Nat'l. Assoc. Silo Mfrs. Proc. 43. p. 98-109. 1955.
83. KELLY, C. F., BOND, T. E., and ITTNER, N. R. "Engineering Design of a Livestock Physical Plant". Agr. Engr. 34:9. p. 601-607. September 1953.

84. KELLY, C. F., BOND, T. E., and ITTNER, N. R. "Water Cooling for Livestock in Hot Climates". Agr. Engr. 36:3. p. 173. March 1955.
85. KIRK, Dale E. "Mechanical Feeders for Silage". Oreg. State Col. Agr. Expt. Sta. Cir. of Info. 518. November 1952.
86. KLEIS, R. W. "Automatic Feed Grinding and Handling on the Farm". Rural Elect. Leaf. 11. Agr. Engr. Dept. Univ. of Ill.
87. KLEIS, R. W. "Blowing Grain from Storage to Feed Area". Rural Elect. Leaf. 6. Agr. Engr. Dept. Univ. of Ill.
88. KLEIS, R. W. "Moving Feed from Storage to Feeding Point". Agr. Engr. 35:9. p. 655. September 1954.
89. KLEIS, R. W. "Operating Characteristics of Pneumatic Grain Conveyors". Ill. Agr. Expt. Sta. Bul. 594. October 1955.
90. KLEIS, R. W. "Reducing Labor in Handling Feed". Rural Elect. Leaf. 15. Agr. Engr. Dept. Univ. of Ill.
91. KLEIS, R. W., and WIAINT, D. E. "Materials Handling - Methods and Labor Requirements". Paper. ASAE Chicago. December 1957.
92. KNIGHT, William H. "Labor-Saving Ideas". Univ. of Idaho Farm Elect. Leaf. 15. September 1951.
93. KNIGHT, William H., and DIXON, John E. "Electric Elevators and Conveyors Find Many Farm Uses". Farm Elect. Leaf. 30. Univ. of Idaho. June 1955.
94. KONNEKER, P. A. "Silage Distributors". Rural Elect. Leaf. 7. Agr. Engr. Dept. Univ. of Ill.
95. LARSON, L. W. "Distributing Chopped Hay on a Mow Drier". Paper at North Atlantic Section ASAE. August 1954.
96. LARSON, L. W. "Equipment for Handling Chopped Hay". Prog. Rep. to N. Y. Farm Elect. Council. 1956.
97. LARSON, L. W. "Low-Cost Handling of Chopped Hay". Farm Research. N. Y. Agr. Expt. Sta. 22:4. p. 13. October 1956.
98. LARSON, L. W. "Mechanical Handling of Chopped Hay". Prog. Rep. to N. Y. Farm Elect. Council. 1954.
99. LARSON, L. W. "Mechanical Silo Unloaders". Prog. Rep. to N. Y. Farm Elect. Council. 1954.
100. LARSON, L. W. "The Farmstead - Next Frontier for Mechanization". Impl. & Tractor 73:1. p. 62-64. January 11, 1958.
101. LEWIS, H. A. "The Mechanization of Livestock Production". Saskatchewan Univ. Farm and Home Week. Addresses & Proc. 93. p. 95-97. 1957.
102. LILJEDAHL, J. B., and BARGER, E. L. "A Pneumatic Gun for Elevating Baled Hay". Agr. Engr. 31:3. p. 111. March 1950.
103. LONGHOUSE, A. D., et al. "Liquid Manure is Valuable". Science Serves Your Farm. Quarterly Rep. W. Va. Agr. Expt. Sta. 1953.
104. LONGHOUSE, A. D., et al. "The Application of Fluidization to Conveying Grain". Agr. Engr. 31:7. p. 349. July 1950.
105. LONGHOUSE, A. D., and SIMONS, H. P. "The Fluidized - Grain Conveyor". W. Va. Agr. Expt. Sta. Bul. 364. December 1953.
106. MACKAY, D. R., HARTSOCK, J. H., and BOOK, J. H. "A Preliminary Report on Tests of the Accuracy of Milk Scales". U. S. Agr. Res. Serv. ARS 42-13. October 1957.
107. MAY, K. E. "Methods of Removing Ensilage from Storage Structures". Brit. Columbia Agron. Assoc. Conf. Rep. p. 22-24. 1957.
108. McCUTCHEON, George K. "Green Feeding of Livestock". Agr. Engr. 36:5. p. 321. May 1955.
109. MILLER, William F. "Batch Weighing and Processing of the Dairy Ration". Agr. Engr. 32:10. p. 547-549. October 1951.
110. MILLER, W. F., and POMEROY, J. H. "Silage Moves from Silo to Feed Bunk". Minn. Farm and Home Science 10:2. Minn. Agr. Expt. Sta. February 1953.
111. MORRIS, W. H. M. "The Milking of Cows - A Methods Study". Cornell Univ. Ithaca, N. Y. Thesis in Agr. Engr. September 1953.

112. MORRIS, W. H. M., and BOYD, L. L. "Efficiency of the Milking Operation". Agr. Engr. 36:9. p. 595. September 1955.
113. MORRIS, W. H. M., and BOYD, L. L. "Time and Effort to Milk Cows". Agr. Engr. 36:8. p. 532-535. August 1955.
114. MOWERY, A. S., CLYDE, A. W., and OLVER, E. F. "An Elevator for Handling Chopped Forage". Penn State Col. Agr. Expt. Sta. Prog. Rep. 44. March 1951.
115. MOWERY, A. S., CLYDE, A. W., and WALTON, H. V. "A Vertical Elevator for Handling Chopped Forage". Penn State Col. Agr. Expt. Sta. Prog. Rep. 64. 1952.
116. MOWERY, A. S., CLYDE, A. W., and WALTON, H. V. "Vertical Cuts Power Needs". Science for the Farmer. Penn State Col. Agr. Expt. Sta. March 1952.
117. MOWERY, R. W. "Electrical Control System for Automatic Feed Grinding". Univ. of Ill. Agr. Expt. Sta. Bul. 555. April 1952.
118. MUELLER, A. G., and HENDERSON, J. D. "Custom Rates for the Use of Power-Operated Farm Machines". Ill. Agr. Expt. Sta. AE 3110. 1955.
119. NELSON, G. L., FRYBEAR, J., and MAHONEY, G. W. A. "A Portable Milking Barn". Okla. Agr. Expt. Sta. Bul. 421. March 1954.
120. OTIS, C. K., OTIS, S. J., and DOMNING, A. E. "Automatic Shut-Off Device for Ground-Grain Conveyor". Agr. Engr. 32:10. p. 546. October 1951.
121. PARKS, R. R. "Mechanical Feeding with Worksavers". Agr. Engr. 32:10. p. 554. October 1951.
122. PEART, R. M. "A Short Vertical Auger for Elevating Silage". Univ. of Ill. Thesis (Unpub.) 1957.
123. PETERSON, W. R. "Development of Mechanical Equipment for Unloading Chopped Forage". Agr. Engr. 30:4. p. 188. April 1949.
124. PHAGEN, C. V., et al. "Cattle Feeders and Equipment". Okla. Ext. Ser. Cir. 540. 1956.
125. PINCHES, H. E. "Management Engineering in Agriculture". Paper. North Atlantic Section ASAE. August 1956.
126. PORTERFIELD, I. D., et al. "A Comparison of Comfort and the Chain Stalls". Jour. Dairy Sci. 34:2. February 1951.
127. PORTERFIELD, I. D., and LONGHOUSE, A. D. "Dairy Cows Need Larger Stalls". W. Va. Agr. Expt. Sta. Cir. 91. April 1954.
128. PRINCE, R. P. "Automatic Feed Processing on the Farm". Science for the Farmer Penn State Col. Agr. Expt. Sta. p. 6. Fall 1956.
129. PRINCE, R. P., and OLVER, E. F. "A Continuous Flow Automatic Feed Grinder and Mixer". Penn Agr. Expt. Sta. Prog. Rep. 164. January 1957.
130. PUCKETT, H. B. "A New Automatic Unloader for Flat-Bottom Bins". U. S. Agr. Res. Serv. ARS 42-17. May 1958.
131. PUCKETT, H. B. "Electronic Controller for an Automatic Feed Grinder". Ill. Agr. Expt. Sta. Bul. 615. August 1957.
132. PUCKETT, H. B., and PEART, R. M. "A Vibrator Powered Meter for Small Grain and Ground Feed". Ill. Agr. Expt. Sta. Bul. 611. June 1957.
133. PUCKETT, H. B., and PEART, R. M. "Volumetric Feed Meters, Their Performance for Automatic Feeding Systems". Ill. Agr. Expt. Sta. Bul. 618. September 1957.
134. RAMBO, Earle K. "Labor Saving Equipment and Devices". Col. of Agr. Univ. of Ark. Ext. Plan 15. June 1947.
135. RAUCHENSTEIN, Emil. "New Methods of Handling Forage Crops and Their Relation to Profitable Dairy Farming". Univ. of Wis. Ag. Econ. 15. August 1955.
136. REAVES, P. M., and BLALOCK, W. E. "Efficiency Study of Pipeline and Conventional Milking Systems". (Abs.) Va. Jour. Sci. 7:4. p. 255. September 1956.
137. REED, Charles H. "Structures for Self-Feeding of Hay and Ensilage". Agr. Engr. 32:7. p. 375. July 1951.
138. REID, James T. "Design Study and Improvement of a Silo Unloader". MS Thesis. Univ. of W. Va. 1955.

139. RENEY, J. P. "A Preliminary Investigation of the Effect of Blade Shape on Forage Blower Performance". Unpub. MS Thesis. Purdue Univ. 1957.
140. RICH, Nathan. "Silage Removal from the Horizontal Silo". Thesis in Agr. Engr. Mich. State Univ. 1953.
141. RICHTER, Donald W. "Equipment for the Reduction of Dairy Chore Labor". Thesis in Agr. Engr. Cornell Univ. N. Y. September 1953.
142. RONNING, Magnar. "The Use of a Self-Feeding Trench Silo for Dairy Cattle". Okla. Agr. Expt. Sta. Mimeo Cir. M-262. June 1954.
143. SCHNEIDER, E. C. "Conveyor Feeding System for Dairy Cows in Stanchion and in Loose Housing". Prog. Rep. 1. Vt. Agr. Expt. Sta. Bul. 586. November 1955.
144. SCHNEIDER, E. C. "Conveyor Handles Forage in Stanchion Barns". Successful Farming. January 1957.
145. SCHNEIDER, E. C. "Mechanizing the Feeding of Dairy Cows". Agr. Engr. 36:2. p. 95-99. February 1955.
146. SCHNEIDER, E. C. "Stanchioned Cows, Conveyor Feed". Electricity on the Farm". 28:7. August - September 1955.
147. SCHNEIDER, Vernon. "Silage Handling". Successful Farming - Materials Handling - Newest Farm Science. Part 4. 1955.
148. SCHNEIDER, Vernon, and HOWARD, John. "Hay Handling". Successful Farming - Materials Handling - Newest Farm Science. Part 3. 1955.
149. SEFEROVICH, G. H. "Systems Engineering Helps This Dairyman: More Cows with Less Labor". Impl. & Tractor 71:22. p. 34-35, 70. November 3, 1956.
150. SHEPHERD, J. B., et al. "Experiments in Harvesting and Preserving Alfalfa for Dairy Cattle Feed". USDA Tech. Bul. 1079. February 1954.
151. SHEPHERD, J. B., et al. "Relative Merits of Four Methods of Harvesting and Preserving Alfalfa Forage for Dairy Feed". USDA Cir. 963. July 1955.
152. SHOVE, G. C. "A Self-Feeding Hay-Storage Structure". Shorthorn World 42:11. p. 247. August 15, 1957.
153. SINGLEY, Mark. "Self-Feeder Silo Controls Silage Flow". Agr. Engr. 38:2. p. 84-86, 93. February 1957.
154. SMITH, H. B., et al. "Labor Utilization in Dairy Buildings". Univ. of Maryland Agr. Expt. Sta. Bul. A-46. August 1947.
155. SMITH, Homer K. "A Preliminary Study of Performance Characteristics of Four Commercial Forage Blowers". MS Thesis. Purdue Univ. 1956.
156. SPRAGUE, D. C., and MOWERY, A. S. "Developing a Conveyor-Belt Gutter Cleaner". Agr. Engr. 30:12. p. 569. December 1949.
157. STANGELAND, S. "Labor Inputs for Live-stock Enterprises". S. Dak. Agr. Expt. Sta. Ag. Econ. Pamphlet 40. September 1952.
158. STRAND, Edwin G., et al. "Productivity of Resources Used on Commercial Farms". USDA Tech. Bul. 112. November 1955.
159. STRUBE, H. L. "Conveyors and Elevators". Chem. Engr. 61:4. April 1954.
160. STURDIVANT, C. T. "Farm Labor-Saving Devices". Okla. Ag. Ext. Cir. 426. 1946.
161. SWEGLE, W. E. "Materials Handling - Newest Farm Science". Successful Farming. 1955.
162. TERRY, C. W. "Vacuum Unloader for Handling Forage". Agr. Engr. 30:3. p. 141. March 1949.
163. TRENARY, O. J., and PATTENGAL, Paul S. "Equipment for Handling Beef Cattle". Colo. Agr. Expt. Sta. Bul. 441-A. September 1955.
164. VAN ARSDALL, R. N. "Farm Materials Handling: The Economics of Barnyard Mechanization". Impl. & Tractor 71:18. p. 22-25, 44, 49-50. September 7, 1957.
165. VAN ARSDALL, R. N., and CLEAVER, Thayer. "Handling Silage and Concentrates for Beef Cattle in Drylot". Univ. of Ill. Col. of Agr. Cir. 714. January 1954.
166. VAN CLEVE, Russell, and DeFOREST, S. S. "Automatic Feed-Grinding System". Successful Farming - Materials Handling - Newest Farm Science. 1955.

167. VAN GINKEL, Earl. "Manure Handling". Successful Farming - Materials Handling - Newest Farm Science. Part 7. 1955.
168. VARY, Karl A. "Hay Harvesting Methods and Costs". Mich. Agr. Expt. Sta. Bul. 392. May 1954.
169. WALKER, Harry B. "Engineering Appraisal of Farm Mechanization". Agr. Engr. 33:11. p. 698-701. November 1952.
170. WENDELL, E. A. "Auger Types for Farm Machines". Agr. Engr. 32:3. p. 167-168, 170. March 1951.
171. WENDALL, P. F. "Farm Materials Handling: The Engineering Principles and Product Applications". Impl. & Tractor 71:18 p. 26-29, 36, 38, 40. September 7, 1957.
172. WHITE, Harold D. "Equipment for Blending, Mixing, and Grinding Feed". 51st Proc. Assoc. South. Agr. Workers. p. 26. 1954.
173. WILCOX, R. H. "Figuring Milk Production Costs in Northern Illinois". Ill. Agr. Expt. Sta. Bul. 583. December 1954.
174. WILSON, E. B. "Labor-Saving Equipment". Mont. Agr. Ext. Bul. 238. 1946.
175. WITZ, R. L., and PRATT, G. L. "Lazy Susan Feeder". N. Dak. Ext. Ser. Cir. AE 53. January 1956.
176. WITZEL, S. A. "Pipeline Milker and Bulk Handling of Milk". Agr. Engr. 34:3. p. 157-158. March 1953.
177. WITZEL, S. A., and DERBER, D. W. "Engineering Phases of Dairy Barn Research". Agr. Engr. 33:10. p. 635-642. October 1952.
178. WOODWORTH, H. C., and MORROW, K. S. "Efficiency in the Dairy Barn". Univ. of N. H. Agr. Expt. Sta. Bul. 387. June 1951.
179. WORKS, D. W., and DAVIS, E. H. "Factors to Consider in Feed Mechanization". Farm Elect. Leaf. 40. Agr. Engr. Dept. Univ. of Idaho. December 1957.
180. YUNG, F. D., and BRUNIG, M. P. "Heating Drinking Water for Livestock". Agr. Engr. 37:6. p. 411. June 1956.
181. ZACHRIAH, Gerald. "Labor-Saving Feed Grinding Systems". Kans. State Col. 32nd Prog. Rep. 1956.

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182. DIXON, J. E. and MARTIN, J. W. "Feed Handling Equipment". Univ. of Idaho. P.N.W. Bul. 12. April 1956.
183. DOBIE, John B. "Materials Handling - Hay Pelletizing". Mimeo. Agr. Engr. Dept. Univ. of Calif. June 1958.
184. PRATT, G. L., SCHULZ, A. H., and WITZ, R. L. "Thawing Silage in Upright Silos". N. Dak. Agr. Expt. Sta. Bimonthly Bul. 19:1. 1956.
185. WITZ, R. L., and PRATT, G. L. "A Semi-Self-Feeding Hay Shed with Dryer". N. Dak. Agr. Expt. Sta. Bimonthly Bul. 16:4. 1954.

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